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The Acquisition of Five Specific Morphemes by English-Speaking Preschool Children

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Abstract

THE ACQUISITION OF FIVE SPECIFIC MORPHEMES
BY ENGLISH-SPEAKING PRESCHOOL CHILDREN

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The purpose of the present research was to study the acquisition of the morphemes involved in the production of the noun plural and possessive, the present progressive tense, the third person singular of the verb and the regular past tense. Research had documented that a time lapse existed between the time that a child was able to correctly inflect a common English word and when he could correctly inflect a phonetically similar nonsense item. This lapse appeared to be the time during which the child formulated an internal rule for the production of each morpheme.

The methodology involved testing sixty children between the ages of three and four years eleven months. The subjects were then arranged into groups by six month age intervals. The children were each given a Peabody Picture Vocabulary Test to determine normal language development. They were then given a test consisting of 19 English words common to their vocabularies and were asked in inflect them using a sentence completion format. Upon completion of this test, the subjects were presented with 19 phonetically similar nonsense words to be inflected in the same manner. Both sets of test items were from those used by Newfield

and Schlanger in their 1968 research.

The data was statistically analyzed by computing the number of children who correctly inflected the five morphemes on either of the subtests, or both. The results were then plotted on time series graphs. A binomial test was used to determine the significance of the proportion of children at each age level who achieved rule level at the .1 level of confidence. The items were also rank ordered by the number of correct responses for each of the five morphemes (with their allomorphic variation) to determine the order of acquisition of the morpheme forms and their rules for production. Finally, the time lapse was computed by finding the difference between the significant age of correct inflection of the English words and the significant age at which the corresponding nonsense words were inflected.

The results of the research indicated that a time lapse did exist between the age of correct inflection of the English words and that of the nonsense words. The time lapse was shown to vary from less than 6 months to more than eighteen months depending on the specific morpheme. One of the five morphemes studied, the past tense, was not able to be charted since there was not a significant number of children at any age who were able to inflect either the English or the corresponding nonsense word correctly.

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THE ACQUISITION OF FIVE SPECIFIC MORPHEMES BY ENGLISH-SPEAKING PRESCHOOL CHILDREN

by

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Each person whose signature appears below certifies that this thesis in his/her opinion is adequate, in scope and quality, as a thesis for the degree Master of Science.

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Chapter 1

THE NATURE AND SCOPE OF THE PROBLEM

During the past forty or more years, speech pathologists, linguists and child psychologists have attempted to discover the means by which a child develops language. Brown (1964) stated that the majority of language acquisition takes place in the child between the ages of eighteen months and four years. Because of the unique problems that arise when attempting to study children so young, research has been slow and difficult to accomplish.

In order to study the acquisition of specific syntactical and morphological skills, two main types of research have been done. The first of these, and probably the best, is to follow small numbers of children longitudinally, ideally for the two and one half years mentioned above. Research such as this has been carried out by Brown and Bellugi (1962) who followed two children and documented the process of emerging syntactical forms and by McNeill (1966) who studied two other children in a similar manner. Although the advantages of this type of research are great, the amount of time necessary inhibits many researchers from using this method. The other frequently used research alternative is to test a number of children at different ages and try to determine patterns in overall development. The results are then generalized to individual children. This method has been utilized by researchers such as Berko (1958), who studied the

acquisition of morphological rules. The latter method is to be employed in this study.

Although the actual events of language acquisition have been studied in detail, it has been difficult to determine why children acquire language the way they do. In the specific areas of morphology and syntax the importance of the adult linguistic model has been considered. It is obvious that the adult provides language models each time he talks to the child but it has been difficult to document how the child utilizes these models in his own speech. Does he take specific items into his language repetoire and learn them through direct imitation, or does he listen for patterns and from them construct his own grammatical rules?

Imitation, for example, plays a large role in the acquisition of some semantic aspects of language (Jenkins and Palermo, 1970). A child may hear a word and then repeat it, not necessarily generalizing it to anything other than that to which it was originally applied. Regarding syntactical development, word order and relations used by young children have been shown by McNeill (1966) to be imitations of the adult expanded forms.

On the other hand, a process of rule induction has also been observed in a child's acquisition of syntax and morphological skills. Berko (1958) reported that if children could supply a correct morphological ending to a nonsense word that he had not heard before, it could be inferred that a rule for its production had been assimilated. She also found, in the same study, that a

child often could produce the correct morpheme on an English lexical item but was unable to generalize (implying a rule) to a non-lexical item. These words (whether pluralizations, verb tense markers, possessives or any other of the tested forms) were inferred by Berko to be vocabulary items, the product of imitation and reinforcement. Ivimey (1975) found this same phenomenon in his study of morphology in children and was even able to suggest three distinct phases outlining the process of change which occurs as the child begins to recognize patterns and then form appropriate rules to govern his subsequent usage. The subjects studied by Ervin (1964) appear to have gone through Ivimey's stages also. Ivimey suggested that all children pass through the stages of morphological acquisition which he described; however, neither he, nor any of the other researchers cited were able to document specific ages at which these three stages occur or to discover the amount of time that the complete process takes.

THE PROBLEM

Literature has shown that children use at least the two methods of imitation and rule induction when acquiring morphological skills. No studies have been done, however, which document the ages at which these strategies are employed by the child or the relationship between the two. If this relationship could be better understood, two important implications for speech pathologists could be noted.

First, the diagnosis of deficient morphological development in a child could be more accurately derived. If, by a

child's age, the clinician could estimate the child's progression through the acquisition stages, she could better choose her diagnostic materials. Test results of children in the imitation of pre-rule stage would have different implications than the identical results of a child who could demonstrate some competence with morphological rules.

In therapy the treatment of children lacking these skills could also be differentiated. It may be that it is necessary to take the child through the imitation stage of learning rather than go directly to the rule formation stage as is often being done currently in therapy. For these reasons, the purpose of this study is to determine if there is a consistent pattern for the acquisition of morphological rules and if so, to document the amount of time that it takes children of normal intelligence to go from a direct imitation stage to an internalized system of morphological rules.

The Problem Statement

By examining the use of five morphological forms in the speech of children between the ages of three and five years, an answer to the following question is sought: Within what age range do the majority of normal children learn a word containing a specific morpheme as an individual vocabulary item, and when is the rule learned for its production?

Limitations and Delimitations

This research sample was delimited to children whose receptive vocabulary age is consistent with their chronological

ages as measured by the Peabody Picture Vocabulary Test (PPVT) who came from homes in which only Standard American English is spoken. Children who were unintelligible or had inconsistent articulation errors were excluded because of the difficulty involved with evaluating their morphological competence. This study also excluded children who spoke a dialect of Standard American English or are bilingual as it is assumed their acquisition patterns may be somewhat different. Because children at these ages are especially difficult and time consuming to test, the sample was limited to fifteen children at each six month age interval, and was divided between the sexes. The small sample size, as well as the restrictions placed upon the subjects may have affected the external validity of the research. But because of the basic nature of the variables being studied, it is hoped that any trends discovered will be generalizable to other children coming from similar linguistic and social backgrounds.

Because of the age of the subjects, much of the testing was by necessity performed in the child's home. This situation imposed a limitation on the research due to differences found in each home situation. As many of these differences as possible were accounted for by attempting to control the amount of external noise surrounding the testing situation, the number of other people in the test area and the presence of the child's mother.

The motivation factor of small children to complete a task such as this may have also limited the study. Every effort

was devoted by the examiner to assure that the best results possible were obtained. Since this is the case in most studies of this type with such young children, results should be comparable in their validity and meaning. Finally, consistency of the testing strategies used by the examiner were maintained as much as possible. The test was administered in a standardized manner to each subject. Natural variations are unavoidable because of the differences among individuals but these differences were minimized.

HYPOTHESIS AND ASSUMPTIONS

Hypothesis

Because previous research has documented a progression of the acquisition of morphology from an imitative skill to that of rule formulation, the purpose of the present study was to examine the stages of the acquisition process. It was hypothesized (1) that in preschool children, the number of syntactic forms observable in their speech that are governed by rules will increase with age; (2) that probable age ranges can be identified within which specific morphological rules are acquired.

Assumptions

It is assumed that:

1. A child's production of a correct morphological inflection with a non-lexical item reflects his knowledge of the rule for its formation.

2. Using a cross sectional approach will provide adequate transference to longitudinal interpretation.

DEFINITIONS OF TERMS

Allomorph

An allomorph is a phonological variation within one English morpheme.

Imitation

Imitation is a strategy for learning a linguistic form by which the subject hears an item, copies it, and then maintains its usage due to selective reinforcement.

Lexical Item

Lexical items in this study are common English words to which the experimental subjects will affix morphemes.

Morpheme

A morpheme is a basic grammatical unit. It is a phonetic marker placed at the beginning or end of a root word. In the case of this study it is the "s" of the plural, the possessive, and the third person singular of the verb; the present progressive "ing"; and the past tense "ed".

Morphology

The study of the combination of morpheme and words into grammatical units.

Non-Lexical Item

The non-lexical items used in this study refer to a set of nonsense words to which the subject will affix a morpheme.

Rule Induction

Rule induction is a higher level of linguistic learning

which takes place when a subject begins to abstract similarities from among the properties of several items and from these generalizes a category or rule within which all can coexist.

Syntax

Syntax describes the order of words used by a subject in an utterance.

Chapter 2

REVIEW OF THE LITERATURE

In order to discuss the acquistion of morphemes by English speaking children, it is necessary to first identify some processes that occur in the overall development of syntax and grammar. One of the first longitudinal studies designed to study these processes in young children was that of Brown and Bellugi (1964). They selected two English speaking children born to college educated parents and studied them for a period of approximately 38 weeks. The children at the onset of the study were eighteen months and twenty-seven months old. Brown and Bellugi described three processes which they observed during the time the children were studied. The first involved the use of imitation of a parental model and reduction in the utterance of the child. The second considered the almost instinctive use of expansions by adults when presented with an incomplete utterance (when judged by adult standards) of a child. The third process studied, and the one most applicable for the purpose of the current study, involved the apparent induction of rules by the child governing the formation of sentences not modeled previously by an adult. Brown and Bellugi were able to document this rule induction process specifically by charting the development of the noun phrase in the language of both children.

Miller and Ervin (1964) conducted similar research in

order to document the acquisition of certain grammatical forms. They tested 25 children longitudinally, with particular emphasis on a subgroup of five children. The children in the subgroup were studied from the time they were about two years of age at varying intervals for about two years. The other children in the study were younger than the subgroup and were given standardized tests in plurals, pronouns and discourse agreement. The subgroup was studied by examining structured free speech samples. Miller and Ervin discovered a first grammatical system, including phrases of two or more words, at the age of approximately two years. They, as well as Brown and Bellugi (1964), saw instances of imitation and non-imitation. They concluded from their study of this subgroup that generalization and rule induction does govern the production of much of the young child's speech. In a specific instance the formation of the plural was studied, using both the free speech samples of the small group and the standardized test results of the larger group. Using a format similar to that described by Berko(1958), the testers were able to document a time lapse between the ability of children to inflect correctly a lexical word common to their vocabulary and a non-lexical word. They found that for all the plural items tested, with the exception of those ending with sibilant finals, the time lapse was approximately two and one half months from the beginning to the end of the learning process.

THE ACQUISITION OF GRAMMATICAL MORPHEMES

In 1958, Berko designed a preliminary study in which she

documented the acquisition of certain morphological rules by English speaking children between the ages of four and seven and one half years. Berko felt that it was difficult to determine with common English words whether a morphological inflection was being used by a child because of direct imitation of an adult model or because he had actually formulated and internalized a rule governing its usage. In order to separate these two processes she devised a test utilizing a number of nonsense words following rules for possible sound combinations in English. Berko used these "words" to test the morphemes involved in the construction of the plural, the possessive of the noun, the third person singular of the verb, the progressive tense, the past tense and the comparative and superalative of the adjective. Pictures representing these words were printed on 27 cards with texts typed on them designed to elicit the desired inflected response. Several English words were included in order to compare lexical items with nonsense items on forms that had been determined to be difficult to elicit during a preliminary test period. The sample included 19 children between the ages of four and five who attended a local preschool, and 61 children in first grade between the ages of five and one half and seven years. The answers given by twelve adult college graduates served as the references to which those answers given by the children were compared.

Berko's results were numerous and significant. First of all, she had hypothesized that if syntax and morphology were learned only by rote or imitation then many of the children should

have refused to attempt to inflect words that were unfamiliar to them. Instead, she found that although many of the answers were not standard English, they were consistent and orderly and showed clearly delimited morphological rules at each stage of development. Second, she found that unlike in other language research, there was no significant difference between the performance of boys and girls. Third, the testing did reveal significant differences between age groups. This was especially true on the best and worst items for the group. Overall, the first grade children were significantly better on slightly less than half of the items presented. On those not statistically significant the trend indicated a process of perfecting rules which were in the process of evolving. A final result of Berko's study concerned the use of identical phonemes with different syntactical and morphemic items. (An example of this is the use of the /Iz/ phoneme for the production of the third person singular of the verb, the possessive of the noun and the plural of the noun.) Berko found that these forms do not evolve together just because they sound the same and that in the case of the above mentioned example, the children used /I z/ correctly almost twice as frequently with the third person of the verb and the possessive form than they did with the plural form. Apparently, morphological significance was deemed by the children more important than phonological sameness.

Berko concluded from her study that the results indicated that rule induction does form the basis of the child's use of English morphemes. She saw consistency, regularity and simplicity

in the patterns studied. The children tended to model the new words after forms that were consistent and used frequently by them; and where a single morpheme had several allomorphs, they were able to use the most common one long before they had the competency to deal with those of limited distribution.

Using approximately the same research procedure as Berko (1958) Ivimey (1975) studied the acquisition of the plural, possessive, progressive tense and past tense morphemes using 126 English school children between the ages of 3.9 and 9.3 years. He used the same test stimuli as Berko and compared the responses elicited from his sample of children to those obtained from fifteen 15 year old boys, 10 non-graduate and 10 graduate adults. Ivimey presented two main aims for his research: "(1) to look for consistencies of error production among a large group of English children of average ability...in order to see what light they threw on the development of rules used; (2) to discover whether the test instrument was sufficiently sensitive to reflect the finer details of the language acquisition process." (Ivimey, 1975:120-121).

In testing his sample, Ivimey went a step further in his research. Whereas Berko (1958) showed a picture and used a standard story or phrase to elicit each response and then scored it against the adult model, Ivimey attempted to prompt a correct response by giving the subject a familiar lexical item to inflect in the same way. So, if a child incorrectly inflected the noun "gutch" with the wrong plural allomorph, he was given the word

"church" or "patch" and asked to inflect it. If the child correctly inflected that, "gutch" was presented again and he was given another opportunity to inflect it correctly. Thus, Ivimey was able to determine more specifically where the child was in his process of defining a rule concerning the formulation of plurals of that type.

Ivimey found that the order of acquistion of the forms studied was similar to that of Berko's study. He was able to define an acquisition model for both noun plurals and verb pasts consisting of three specific and ordered stages which began with a total absence of inflection and concluded with the correct and acceptable adult form. From his research Ivimey concluded that children do use rules in their language production. He qualified this, however, by pointing out that in the earliest stages of acquisition, the children appeared to learn specific linguistic facts (or it may be assumed, specific vocabulary items) and then formed rules underlying these facts. Furthermore, Ivimey found that the formation of the rules can be very slow in developing, spanning seven or eight years in some children of average ability. He concluded by attributing the large disparity in the acquisition timetable to both differences in the cognitive function of individual children and the linguistic environment in which one is reared.

In his research, Ivimey (1975) loosely compared the resultant ages of acquistion of the forms studied with the children in Berko's study in 1958. He attributed the differences encountered

in age of acquisition of both groups to general cognitive ability and environmental influences.

In an attempt to study the environmental factor, Shriner and Miner (1968) studied the morphological structures of 25 culturally advantaged and 25 culturally disadvantaged preschool children matched by mental age. They, too, studied plurals, verb forms and possessives. Shriner and Miner utilized twenty pictures in the same manner as Berko and Ivimey in order to test expressive use of morphological inflections and included a receptive portion to test comprehension of plural nouns. This was accomplished by giving an auditory stimulus (the singular of the noun) and a visual one (a plate with four nonsense pictures) and asking the child to point to the correct picture. The examiner would state: "This is a gat.... If this is a gat, point to gats." The results of this research revealed no statistical difference between the performance of the two groups. Both increased their ability to inflect an unfamiliar word as a function of increased mental age. They concluded that the ability to form morphological rules is not statistically different in economically disadvantaged or advantaged children when mental age is controlled.

One final study needs to be examined. In 1968, Newfield and Schlanger compared the acquisition of English morphology by normal and educably mentally retarded (EMR) children. They used 30 EMR children between the chronological ages of 8-10 and 12-1 and compared them to 30 children judged as having normal language development between the ages of 5-8 and 8-4. Both groups were

given the Peabody Picture Vocabulary Test to determine mental age. The mean mental age of the retarded group was 6-2; that of the normal group, 6-10. Both groups were tested with 24 items from the Berko test and 27 lexical items that matched the nonsense words. The results on both the lexical and non-lexical items paralleled those of Berko for both groups. A progression in the order of mastering the lexical items before non-lexical items was observed although no attempt was made to document the time lapse. Significant correlations were found in the normal subjects for nonsense noun score and mental age, nonsense verb score and mental age and total nonsense word score and mental age. With the retarded subjects significant correlations were found between both lexical items and non-lexical items and mental age. They also found that when comparing normal children with EMR children of equivalent mental ages, a significant difference in morpheme usage was still noted. The authors concluded that the order of acquisition was the same for both groups. Since significant differences were determined in both groups on performance of lexical and non-lexical items, there must be an undefined time lag between the acquisition of the ability to inflect a familiar word and that of a nonsense word.

Chapter 3

RESEARCH DESIGN AND PROCEDURES

The purpose of this study was to identify sequential trends in language development of preschool children. A cross sectional descriptive time series was the experimental design to be implemented. The cross sectional design was chosen over a longitudinal design because of the greater opportunity to study a large sample of children. This is considered necessary in order to account for the variations in child language development. After each age group had been tested with two morphology subtests, the developmental sequence was charted, the proportion of children at each age level showing rule formulation was computed and the significance of these proportions was determined.

POPULATION AND SAMPLE

Sixty children between the ages of three and four years eleven months served as subjects. The subjects were drawn from those enrolled in local nursery schools and church Sabbath schools living within the Riverside area. The Riverside community, adjacent to Los Angeles, California, is considered urban with approximately 158,000 residents. The city contains one city college, two church related liberal arts colleges and a state university, as well as a number of major hospitals. For the purpose of basic research, it is believed that a sample drawn

from this population will not be atypical of communities of this size found elsewhere in the United States.

The sample included children who are between the ages of three years and four years eleven months who are from homes in which Standard American English is spoken. Fifteen children were selected by age and normal performance on the PPVT for each of four subgroups. Approximately equal numbers of boys and girls were chosen. The subgroups were divided into age groups according to six month age intervals. Two tests of morphological competency were administered to each child, one containing 19 of Berko's (1958) nonsense words and one containing 19 lexical words matched for morpheme similarity to the nonsense items. In all cases, the lexical items were presented first to aid in the understanding of the task by the children.

MATERIALS AND SOURCES

In order to select a sample from the above defined population, normal language functioning must be determined. The Peabody Picture Vocabulary Test measures receptive vocabulary and has been determined to be an adequate indicator of verbal language ability. Thus, the PPVT was used to screen all children considered possible sample candidates.

The lexical and non-lexical test items used were those of Newfield and Schlanger (1968) in their study. The non-lexical items consisted of 19 black and white line drawings of cartoon-like animals, men performing unusual actions, and imaginary

objects. These were from the original test items used in Berko's (1958) study.

The lexical items were designed by Newfield and Schlanger to parallel morphologically and phonologically the nonsense items presented. Nineteen pictures were used in this subtest. The pictures for these items were similar in design to those of the nonsense items and again consisted of black and white lined cartoon-like drawings. The tests for both the nonsense items and the lexical items were printed on the cards in such a way as to elicit the desired word response.

METHODOLOGY

Data Collection

The first step was to screen all possible candidates with the PPVT to determine eligibility for the experiment. From the children screened fifteen children were chosen at each of four six month age intervals. These children served as the subjects of the study.

Each child was then tested with the lexical item morphology subtest. Standardized instructions were used as well as the printed story on each card. Following completion of the lexical item test, the nonsense word test was administered in a similar manner. The scores obtained from each group were computed and analyzed statistically to determine significant trends.

Since many of the children were tested in their homes, a standardized environment was not feasible. It was necessary,

therefore, to manipulate the external situation as much as possible. This was accomplished by controlling for environmental noise and excluding all persons but the mother from the testing area. In this way, there was less chance of distraction so that the results may be assumed to be valid.

Chapter 4

RESULTS

The ability to correctly inflect a series of grammatical morphemes was evaluated for sixty children between the ages of 3-0 and 4-11 years. The children were tested on two tests of morphological competency: one utilizing 19 common English words and one utilizing phonetically similar nonsense words. Results were analyzed using the following methods.

Time Series Graphs

For each morpheme inflection, a count was made of the number (N) of children who scored correctly on both the common vocabulary item and the associated nonsense item. The assumption was that when both items could be correctly inflected, the rule had been internalized.

Where more than one item combination was used to test variations of a morpheme, the total number of successful combinations was divided by the number of combinations presented. For example: when testing the "s" inflection for plurals, two combinations were used. Hence, the total count of successful combinations on these two trials was divided by two to give an average.

The N-count for each morpheme combination was made for each of the five grammatical constructions and for each of the four time periods observed. The results of the N-counts were

then plotted on time series graphs - one graph for each of the five grammatical constructions (see Tables 1-5 in the appendix). From the graphs it is possible to visually observe progressive trends from one time period to the next.

Binomial Test of Significance

The acquisition of a morpheme rule is obviously more than a chance happening. Nevertheless, it is possible that determined effort and guessing might result in the production of apparently correct responses but without any true rule learning.

To test for this chance effect, a binomial test of significance was made at each age level. The basic concept implies that the proportion of successes in a group must be significantly greater than the proportion of failures before confidence can be placed on the internalization of an inflection rule. When significance reaches .1, it can be assumed that the results reflect something more than chance and that internalization is evident at this age level. It was determined that 10 out of 15 needed to have correctly inflected the form in order to reach significance at the .1 level of confidence; eleven need to be correct for significance at the .05 level of confidence.

Rank Order

In an effort to determine the order of acquisition for English and nonsense word inflections, the results of both tests were rank ordered from highest to lowest scores. The rank orders are presented in Tables 6 and 8. The mean number of correct

responses at each age level was then computed and is presented in Tables 7 and 9. The rank orders were highly consistent for the acquisition of English inflections but varied considerably at the rule level.

Time Lapse

The time lapse was determined by finding the difference between the significant age of correct inflection of the English words and the significant age at which the corresponding nonsense words were inflected. A table containing this information can be found in the discussion.

Table 6

Rank Order of the Morphemes with English Words

morpheme	age groups I	II	III	IV
Progressive	1	3	1	1
3rd person sing.--simple	2	2	3	3
plural--simple	3	1	2	3
plural--complex	4	5	4.5	6
possessive	5	4	4.5	3
past tense--simple	6	7	7	7
3rd person sing.--complex	7	6	6	5
past tense--complex	8	8	8	8

Table 7

Mean Number of Correct Responses on English Items

Progressive	*15	*14	*15	*15
3rd person sing.--simple	*12.5	*14.5	*14	*14
plural--simple	**10.2	*14.6	*14.8	*14
plural--complex	8.7	**10.4	*13	9.7
possessive	8	*12	*13	*14
past tense--simple	7.5	8.5	8.5	9
3rd person sing.--complex	6.5	9	*10.5	*10.5
past tense--complex	4	5.5	7	8.5

* significant at the .05 level of confidence
** significant at the .1 level of confidence

Table 8

Rank Order of the Morphemes
with Nonsense Words

morpheme	age groups			
	I	II	III	IV
plural--simple	1	1	1	1
3rd person sing.--simple	2.5	2.5	3	2
possessive	2.5	4	4	3
progressive	4	2.5	2	4
past tense-simple	5	6	7	6
3rd person sing.--complex	6	5	6	5
plural--complex	7	7	5	7
past tense--complex	8	8	8	8

Table 9

Mean Number of Correct Responses
on Nonsense Items

plural--simple	9.8	*11.2	*14	*12.8
3rd person sing.--simple	8.5	*11	**10	*12
possessive	8.5	7	8.5	*11
progressive	7	*11	*12	**10
past tense--simple	4.5	3.5	4.5	4.5
3rd person sing.--complex	4	5	5.5	5
plural--complex	3.3	1.6	7.3	3.3
past tense--complex	.5	1.6	2	1

* significant at the .05 level of confidence
** significant at the .1 level of confidence

Chapter 5

DISCUSSION

In the present study sixty children between the ages of 3-0 and 4-11 years were tested on two tests of morphological competence. The following morphemes were examined: the present progressive tense of the verb, the regular noun plural, the possessive of the noun, the third person singular of the verb and the regular past tense. The purpose of the research was to provide more information about the ability of a child to inflect a word with a correct morpheme and to then internalize a rule for its production. A time lapse between the correct usage of the morpheme and the formulation of the rule for its production has been documented but the length of time lapse between the two has not previously been studied in depth.

Acquisition Order of Morphemes Using English Words

In order to discuss the acquisition model established by the present study, each morpheme was ranked according to the percentage of correct usage in each age group. The four rank orders were remarkably similar across age groups.

When tested with a binomial test, it was found that at least ten of the fifteen children at each age group needed to have correctly used a morpheme in order for it to be considered at the mastery level at the .1 level of confidence. (Although the .05 level of confidence is traditionally used, .1 was chosen

for this study as the possibility of a "chance" correct response was essentially nonexistant.) In the present research, the first three allomorphs ranked, the present progressive tense, the "simple" plural (formed by adding /s/ or/z/ to a root), and the "simple" third person singular (also formed by appending the root word with an /s/ or /z/ phoneme), were at a mastery level in the youngest age group. This indicated that these forms had already been learned before age three. For the next forms ordered, the plural formed by adding the /ɪz/ (hereafter referred to as the "complex" plural) and the possessive, mastery was not achieved until group II (ages 3-6 to 3-11). One exception was with group IV, who were unable to inflect the complex plural as consistently as groups II and III. Group III (ages 4-0 to 4-5) showed the development to mastery level the /ɪz/ form of the third person of the verb. Neither the simple past tense (that formed by adding a /d/ or /t/ phoneme to a root word) nor the complex past tense(that formed by attaching another syllable to the root verb) reached a mastery level by the oldest subjects in the study. When looking across ages it was also significant to note that with only one exception there was an orderly increase in the ability to use each morpheme as the age groups went from youngest to oldest. The one exception, as was mentioned above, was that of the complex plural with which each successively older age group improved its usage except for group IV (ages 4-6 to 4-11). It is questionable whether this finding would hold up with a larger sample.

Comparing the rank order of acquisition of morphemes on English words achieved in this study with those achieved by other researchers was both interesting and fruitful. Roger Brown (1973), after studying three children longitudinally, compiled an acquisition model containing fourteen morphemes including the five studied in the present research. When deleting the morphemes not included in this research, Brown's model revealed the following acquisition order: present progressive, plurals, possessive, regular past tense and third person singular. Excluding the apparent early development of the third person singular form by the present subjects, Brown's acquisition order is largely the same as that determined in this research. Brown's three subjects were followed longitudinally for a period of from ten to sixteen months. The data was collected at one month intervals from unstructured free speech samples.

In similar research constructed by deVilliers and deVilliers (1973) free speech samples from 21 children ranging in age from 19 to 41 months were analyzed for morphological competence. Fourteen morphemes were scored on the basis of percentage of correct usage in obligatory contexts. Their results were rank ordered on two different basis, one referring to the lowest mean length of utterance (MLU) in which a morpheme reached a 90% correct criteria and one in which the total percentage of correct usages of each morpheme was combined into one rank order. When the five morphemes considered in the present study were abstracted from the fourteen studied by the deVilliers the results were identical

to those obtained by Brown (1973). Again, with the exception of the third person singular, the order was roughly the same as that of the present research. Neither Brown nor the deVilliers made any distinction between allomorphs of the same morpheme in their research. Since different allomorphs have been shown by previous researchers to develop at different rates (Ivimey, 1975) some differences in acquisition order would be expected when all forms were averaged together.

Acquisition Order of Nonsense Items

In order to test for the acquisition of rules governing morphological competence, nonsense items were tested in the same manner as the English words. The results section shows the mean number of children who were able to correctly inflect the nonsense items with appropriate morphemes. The inferences made from these data relate back to the hypothesis that the correct morphological inflection of a nonsense word (or one to which a child had not previously been exposed) indicated knowledge and usage of a previously abstracted rule for its use. Working with that premise, the data revealed that the rules determining the formation of the simple plural, the third person singular of the verb formed with an /s/ or /z/, and the progressive tense were established in a significant number of children by age group II (3-6 to 3-11 years). The possessive tense rule was established by age group IV (4-6 to 4-11). The remaining four allomorphs studied had not reached criteria for rule level by the oldest children in the study. When looking at the percentages of correct usage of the

final four forms, it is apparent that even the oldest children were not close to reaching the rule level criteria. The implication was that the rules of formation of the simple and complex past tense and the complex plural and third person singular were learned considerably later than four and one half years.

When examining the percentages of correct inflection of each morpheme on nonsense words across ages it was interesting to note that a regular rule learning pattern did not appear as it had with the acquisition order of the English items. As a matter of fact, the percentages tended to fluctuate up and down all the way across the age groups and was not regular on even one allomorph. These findings suggest that the formulation of morphological rules is a highly individualized process and varies considerably from child to child.

Berko (1958) studied two groups using a test consisting of nonsense words to be inflected in the same manner as the present study. One group consisted of 33 preschoolers who were from four to five years of age (equivalent to groups III and IV of this study) and one consisted of 61 first graders between 5-6 and 7-0. Since the younger group corresponded in age, number and probable educational experience of the parents, with the four year old groups in this study, comparisons were easily made (see Table 10). Overall, the two four year old groups were highly similar in their abilities to inflect nonsense words. The percentages of correct usage on the present progressive tense,

the noun possessive, the complex plural and the complex past were all within a few points. Some interesting differences were apparent. For example, 67% of Berko's preschool group had attained mastery of the simple plural morpheme while 89% of the four year old subjects in the present study had achieved it. Conversely, where 57% of the four year olds in Berko's sample had attained mastery of the simple past tense and 32% had mastered the complex past, only 30% and 10% respectively of the four year olds in the present study had done so. Although the percentages were different, both studies indicated that all regular forms of the past tense develop last in the sequence of five. It is possible that a larger sample in both studies would have revealed a closer correlation on most of the differing items, although the possibility of dialectical differences in two very different geographical regions of the United States may also have had an influence on the results.

Table 10

Comparison of Berko's Results with the Present Research

Morpheme	Group I & II	Group III & IV	Berko's Preschool
Plural--simple	70%	89.3%	67.3%
Progressive	60	73	73
3rd person sing.--simple	65	73	--
Possessive	52	65	68
3rd person sing.--complex	30	35	52
plural--complex	16	35	28
past tense--simple	26	30	57
past tense--complex	7	10	10

Computation of the Time Lapse

Previous researchers have studied morpheme acquisition patterns by children with both English and nonsense words. However, there is little data reported in the literature which documents the time lapse between the two behaviors. The purpose of the present study was to determine, if possible, a measureable time lapse between the time a child could inflect a common English word with the proper morpheme and when he could inflect a similar nonsense word with the same morpheme presented in its proper context. The fact that a time lapse exists had been previously documented by several researchers (eg., Ivimey, 1975; Ervin, 1964). Although the children were grouped at six month age intervals which may seem a rather large time span for children so young, several trends were observable. These trends are summarized in Table 11.

Table 11

Computation of Time Lapse

Morphemes	English mastery age	Nonsense mastery age	Time Lapse
progressive	3-0 to 3-5	3-6 to 3-11	at least 6 mo.
3rd person sing.--simple	3-0 to 3-5	3-6 to 3-11	at least 6 mo.
plural--simple	3-0 to 3-5	3-6 to 3-11	at least 6 mo.
plural--complex	3-6 to 3-11	*	more than 1 yr.
possessive	3-6 to 3-11	4-6 to 4-11	within 1 yr.
3rd person sing.--complex	4-0 to 4-5	*	at least 1 yr.
past tense--simple	*	*	--
past tense--complex	*	*	--

* Mastery was not achieved by any age

The results of the study indicated that whereas the children were able to correctly inflect a verb with the progressive morpheme, the simple third person singular and the simple plural by age group I (3-0 to 3-5), they were not able to inflect similar sounding nonsense words until group II (3-6 to 3-11). This indicated that it took at least six months for the rules for these forms to be internalized. This, incidentally, did not correspond with the findings of Ervin (1964) who studied three children longitudinally and determined that the time lapse for plurals was less than three months. The present study showed possessives to be used with English items by age group II (3-6 to 3-11) but not with similar nonsense items until age group IV (4-6 to 4-11). Hence, the time lapse for abstracting a rule for the formation of possessives was approximately one year. The third person of the verb formed by adding an /ɪz/ syllable to a root word was mastered with English words by age group III (4-0 to 4-5). A significant number of children in age group IV were still unable to similarly inflect a nonsense item indicating that the mastery of the rule comes after more than six months. The complex plural form (formed by adding the /ɪz/ syllable) was mastered with English word by group II (ages 3-6 to 3-11) but also never reached mastery by the oldest subjects. It could be inferred that the rule of that form takes over twelve months to be developed. The last two forms studied, the simple and complex past tense, were not successfully inflected by any group. Although a higher percentage of the older children were able to inflect the

simple past tense with English words none were close to achieving the criteria needed for mastery of the form. On the basis of the present data, no conclusions can be drawn other than to state that the simple past tense probably develops earlier than the complex and both develop after the age of five.

This was supported by the research of Berko (1958) with the older group who showed improvement over the younger group on both forms. Newfield and Schlanger (1968) whose normal sample of children had a mean chronological age of 6-10 years reached 100% correct productions on the simple English past tense and 82% correct productions on the complex form. Newfield and Schlanger's data suggested that while the rule for production of the simple past tense is apparently developed by approximately 6-10 (the subjects had 90% accuracy on the nonsense items in their study) the rule for the formation of the complex past still was in the process of being learned since the percentage of correct inflections on the nonsense items was only 65.

Naturalistic versus Experimental Research

Several interesting and significant comparisons have been made between the results of the present research and those of Berko (1958), Brown (1973), deVilliers and deVilliers (1973) and Newfield and Schlanger (1968). It was demonstrated, for example, that the order of acquisition for English morphemes was remarkably consistent among all the studies cited. Furthermore, the acquisition order of morphemes inflected on nonsense words paralleled the English word findings across all the studies

mentioned above. One significant difference in the results needs to be accounted for, however. The research performed by Brown and the deVilliers utilized as subjects, children considerably younger than than those used in Berko's study or in this research. Two of Brown's three subjects were studied up to the age of 3-6 years while the third was only studied until the age of 2-3. Yet, all three children in Brown's study achieved the tested forms at a much earlier age than those in the present study. These findings correlated with those of the deVilliers, whose subjects ranged from age 1-4 to 3-4 years. Brown discussed this phenomenon when he compared the acquisition models developed by several researchers, including those cited above.

The primary difference, according to Brown, between his study and the deVilliers was the use of free speech samples as opposed to an experimental design. Brown felt that a transcription of a child's free speech patterns was a more accurate measure of his morphological competency. He cites the problems of maintaining a child's attention and the need for the child to possess test taking skills not necessarily acquired by a young child as the two major negative influences on results obtained through an experimental task of the type used in the present investigation. These problems were indeed encountered during the course of this research. However, due to the very nature of the spontaneous free speech sample, it is not usually possible to elicit all of the forms that a researcher may wish to study; therefore, some artificial means of doing so must be contrived. This was the

purpose of this research. It is probable that a combination of data resulting from studies of both types would yield the most reliable results.

Chapter 6

SUMMARY AND CONCLUSIONS

Overall, the findings of this research supported its thesis. The purpose of this investigation was to document a time lapse, if there was one, between the time a child could correctly inflect a common English word with the proper morphological ending and when he could do it the same way with a nonsense word. The results indicated that not only did a time lapse exist for each morpheme but that the lapse varied from within six months, as in the cases of the simple plural, third person singular and the present progressive, up to eighteen months as in the case of the complex form of the plural. Four of the five morphemes tested were able to be charted in this manner. One, the past tense morpheme, was unable to be documented because even the oldest subjects were unable to correctly inflect the English items in significant numbers. Obviously, without correct English inflection, there was no starting point at which to begin charting a time lapse.

Suggestions for Further Study

1. Pertinent data could be obtained by duplicating this research using both younger and older subjects. That way, more specific information concerning the English acquisition of the present progressive tense, the regular plural and the third person singular of the verb could be obtained, as well as information concerning the acquisition of the past tense and the rule for

its formation.

2. A comparison of data arrived at through a combination of free speech transcription and an experimental test design would be valuable. By using the same children with both tasks, it would be possible to measure the significance of any differences that were obtained.

3. A longitudinal study using large numbers of children tested on both morpheme subtests at regular, short intervals would give optimum results. The time lapse between acquisition of morphological competence with English words and nonsense words could then be documented with more precision.

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APPENDIX

Table 1

Mean Number of Correct Responses
for each Age Group-Plurals

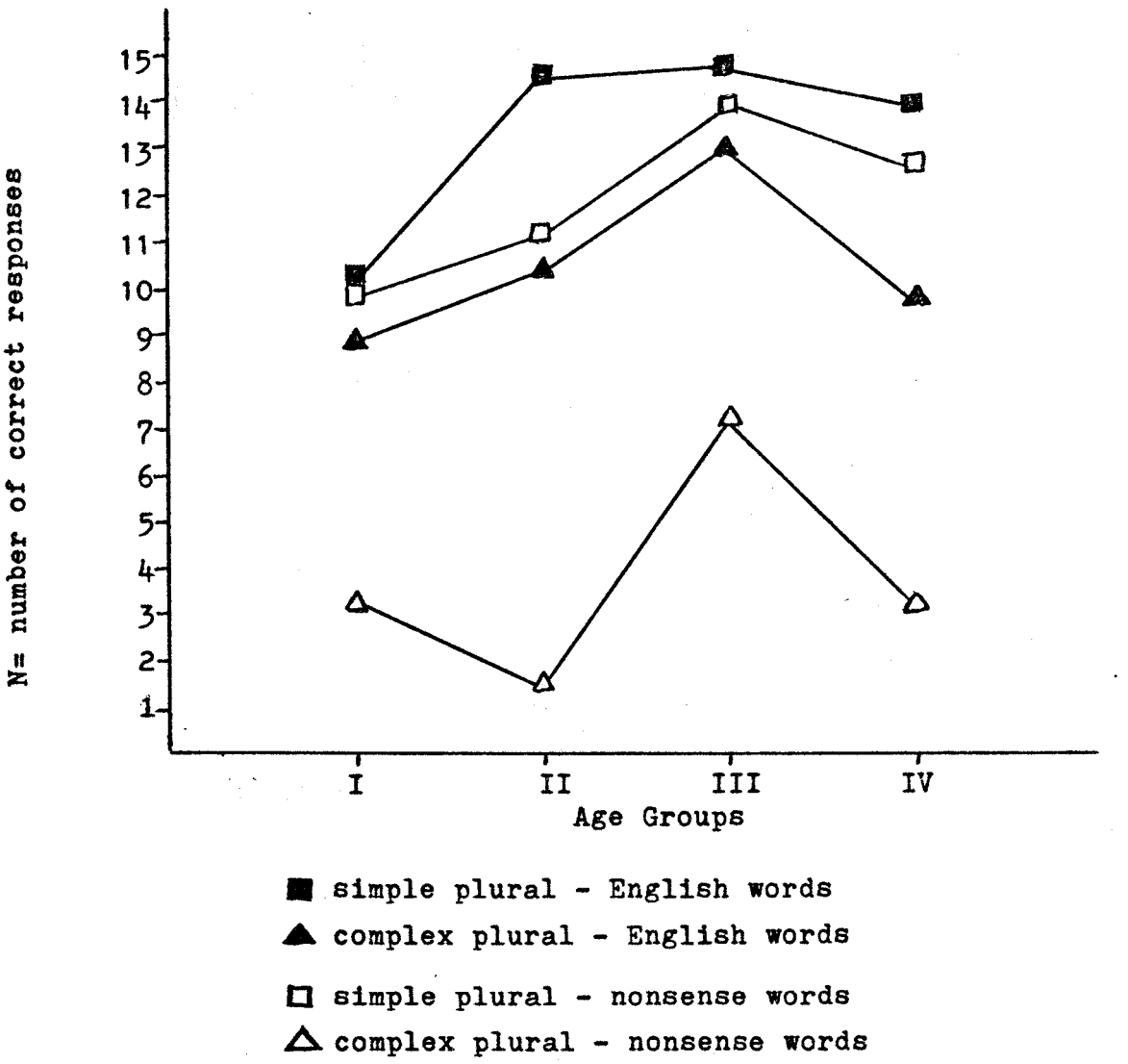

Table 2

Mean Number of Correct Responses for each Age Group - 3rd Person Singular

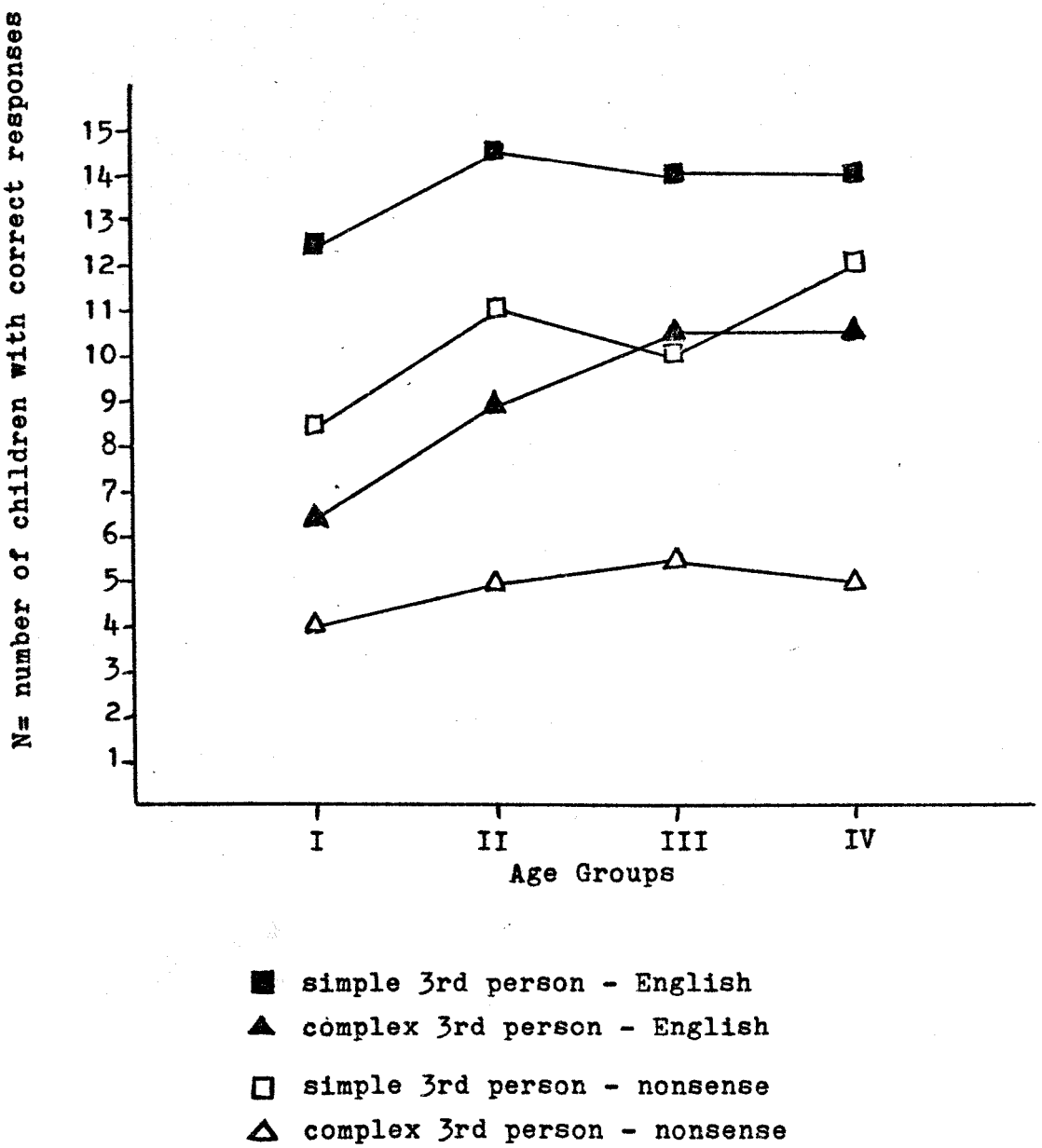

Table 3

Mean Number of Correct Responses for each Age Group - Progressive Tense

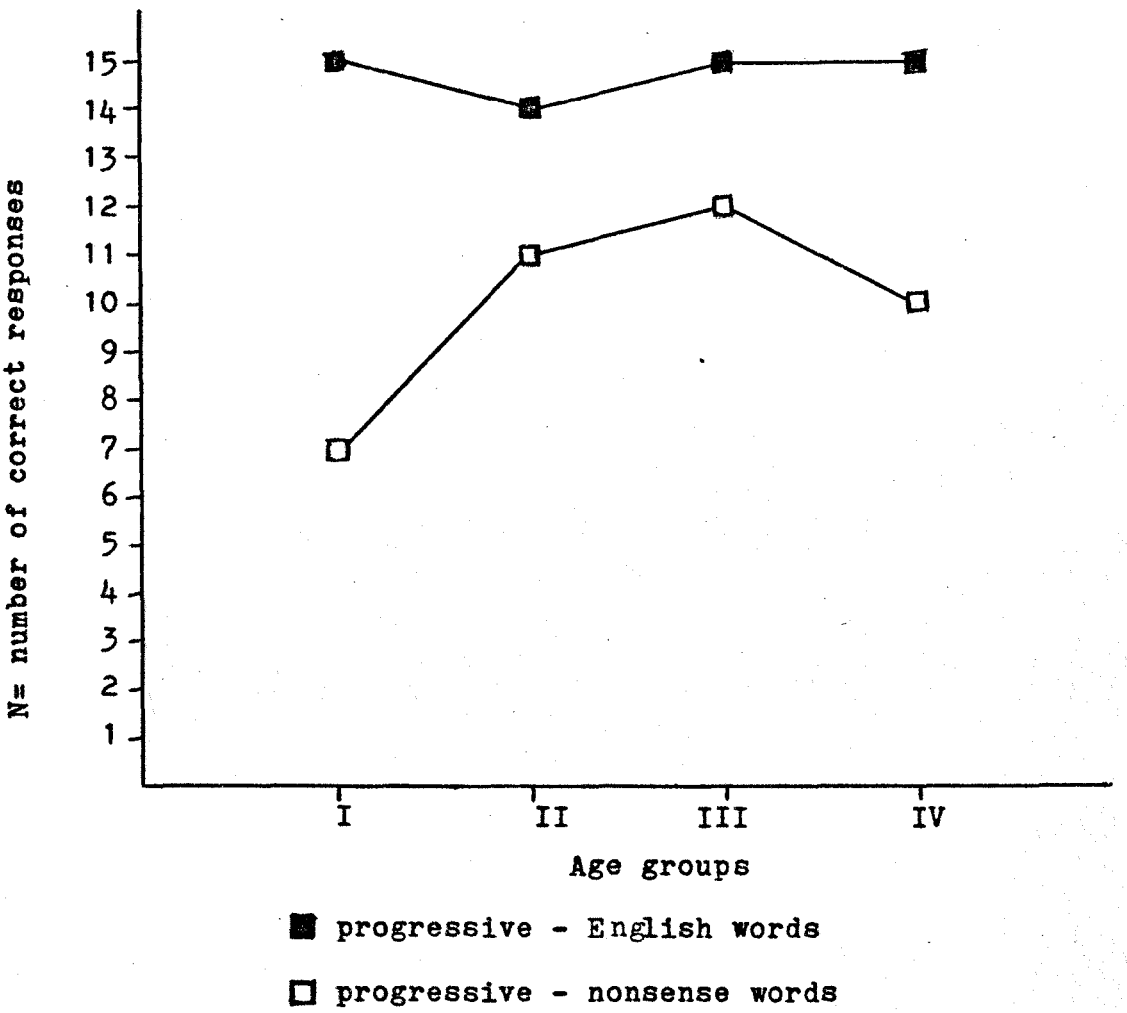

Table 4

Mean Number of Correct Responses
for each Age Group - Noun Possessives

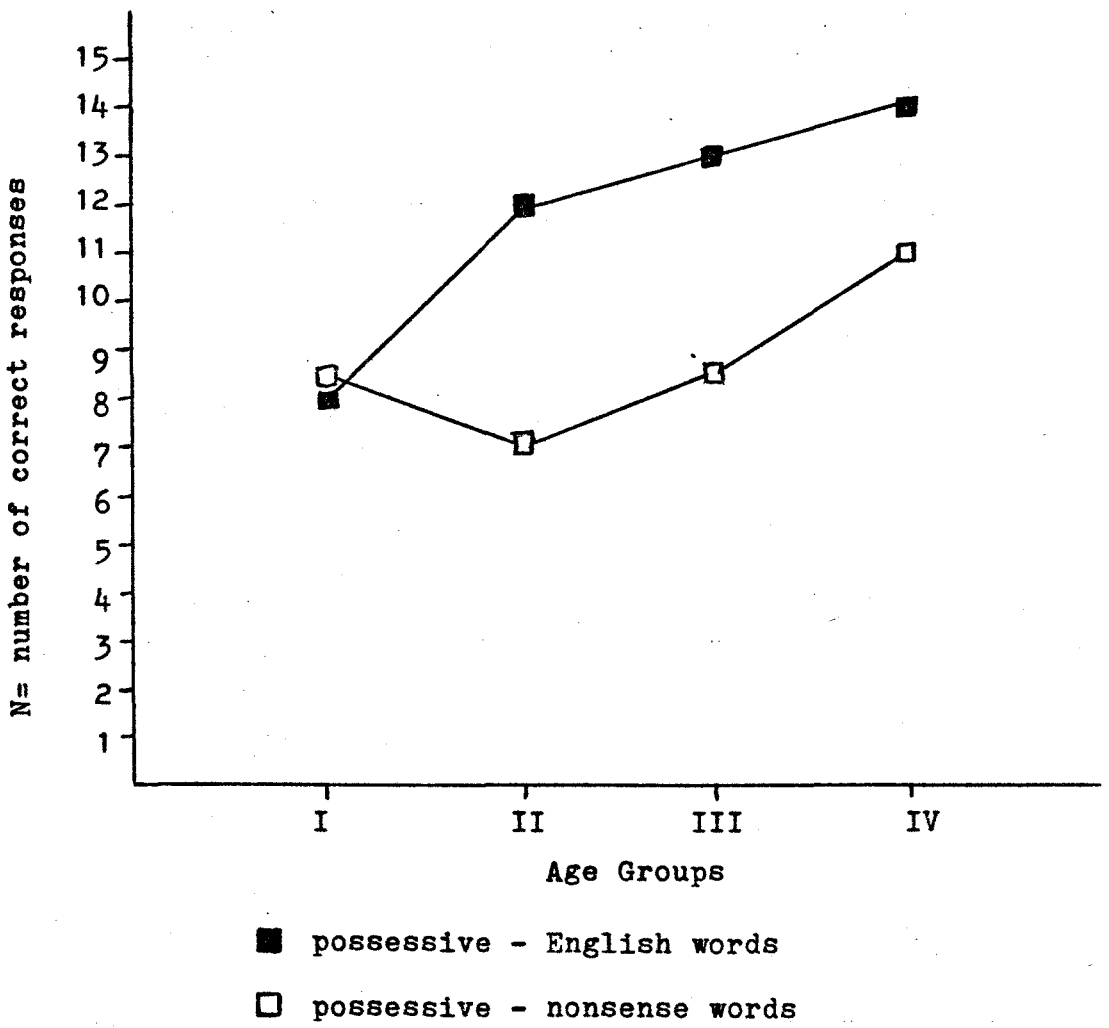

Table 5

Mean Number of Correct Responses
for each Age Group - Past Tense